

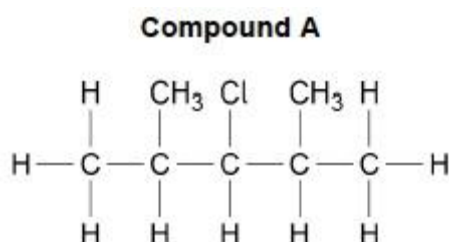
Name of the Student: _____

Max. Marks : 15 Marks

Time : 15 Minutes

Q1.

Compound **A** is a halogenoalkane.



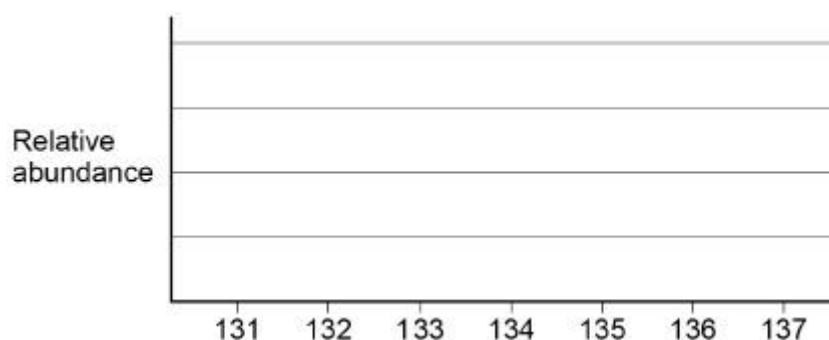
- (a) Name Compound **A**.

(1)

- (b) Compound **A** has a relative molecular mass (M_r) of 134.5
The main isotope of hydrogen is ^1H
The main isotope of carbon is ^{12}C
Chlorine consists of two common isotopes, ^{35}Cl and ^{37}Cl , of which 75% is ^{35}Cl
The mass spectrum of **A** was recorded when **A** was ionised by electron impact to form A^+ ions.

Draw, on **Figure 1**, the peaks for the main molecular ions in the mass spectrum of **A**.

Figure 1



(2)

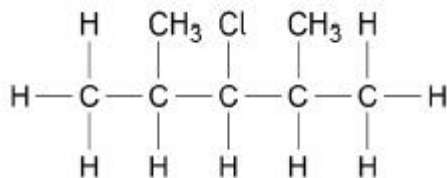
- (c) Reaction of **A** with warm, dilute aqueous sodium hydroxide forms alcohol **B**.

Name the mechanism for this reaction.

Outline the mechanism using the structure of **A** shown.
Include the structure of the product, alcohol **B**.

Mechanism _____

Outline of mechanism



(4)

- (d) Reaction of **A** with hot, ethanolic potassium hydroxide gives alkene **C**.

Name the mechanism for this reaction.

State the role of the hydroxide ions.

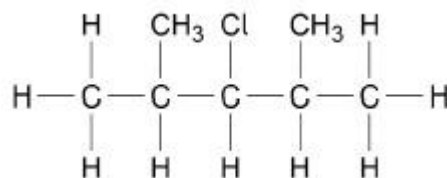
Outline the mechanism using the structure of **A** shown.

Include the structure of the product, alkene **C**.

Mechanism _____

Role of hydroxide ions _____

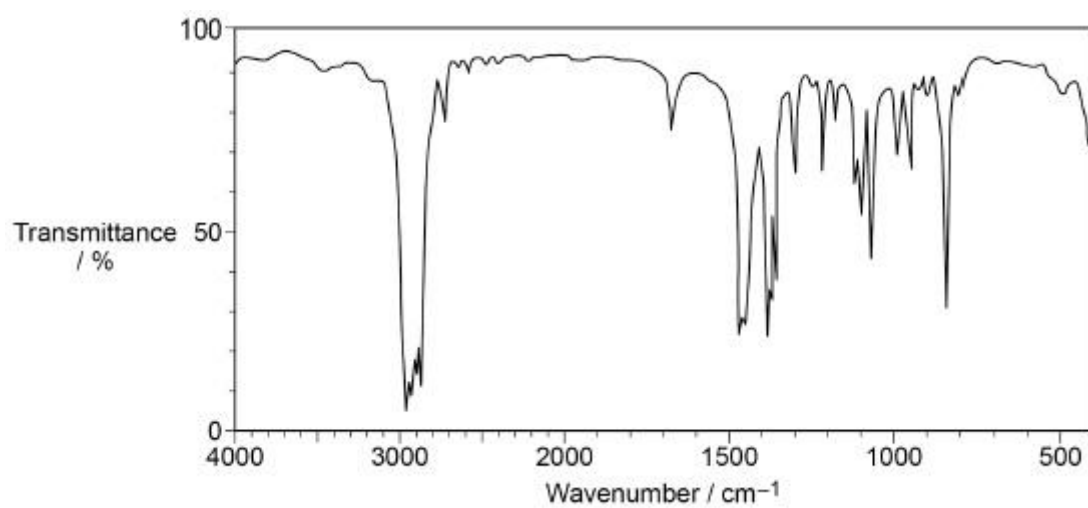
Outline of mechanism



(6)

- (e) The infrared spectrum in **Figure 2** is that of either alcohol **B** or alkene **C**.

Figure 2



Tick the box that shows the correct compound.

Explain your answer with reference to a bond and the wavenumber of its absorption.

Alcohol **B**

☐

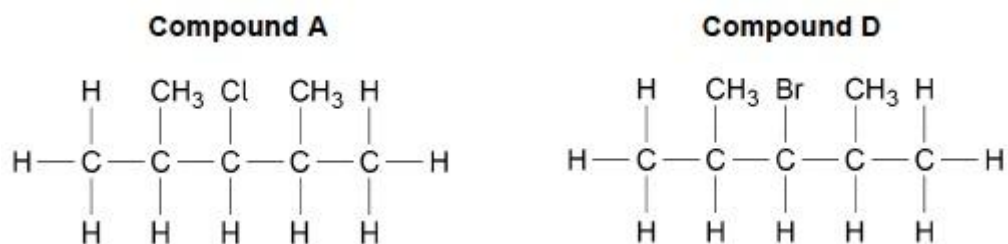
Alkene **C**

☐

Explanation _____

(1)

- (f) Compound **D** reacts with dilute aqueous sodium hydroxide in a similar way to **A** to form alcohol **B**.



Explain why **D** reacts more quickly than **A** with dilute aqueous sodium hydroxide at the same temperature.

(1)

(Total 15 marks)